Florida Forest Service

Forest Health Highlights 2020

Forests of Florida

Florida's forests are expansive and diverse and include subtropical systems, baldcypress wetlands, pine flatwoods, pine-oak scrubs, gum-cypress swamps, coastal mangroves, isolated hardwood hammocks, and more extensive upland hardwoods. The state's mild climate, tourism industry, and many ports of entry also make it particularly vulnerable to the introduction and spread of non-native invasive species. Challenges to forest health in the Sunshine State are therefore myriad and complex. What follows are only a small sample of notable examples of Florida's forest pest and disease-related activities and scenarios from 2020.

Forest Health Section

The Florida Forest Service's Forest Health Section staff is constantly involved in countless technical assistance requests from a wide variety of recipients. This recipient list includes but is not limited to The International Society of Arboriculture, The University of Florida and the Cooperative Extension Service, The Division of Plant Industry, FFS personnel, Forest Industries, the Society of American Foresters, The Florida Forestry Association, Florida A&M University, Private Landowners, and others. Although the COVID-19 pandemic severely curtailed in-person meetings, the FH Section offered at least 4 presentations and training seminars in FY 19/20, to approximately 115 attendees. The Florida Forest Service hosted the Southern Group of State Foresters Forest Health Committee winter meeting in January 2020. The FFS Forest Health Section staff also provided assistance in the form of identifications, diagnoses, and management recommendations regarding over 240 forest-health-related incidents statewide, in addition to recording ground survey data in at least 470 locations and sorting 370 survey trap collections (Figure 1). In addition, the FH Section is in the process of developing and revising several new and existing publications for public education and outreach regarding forest pests and diseases.

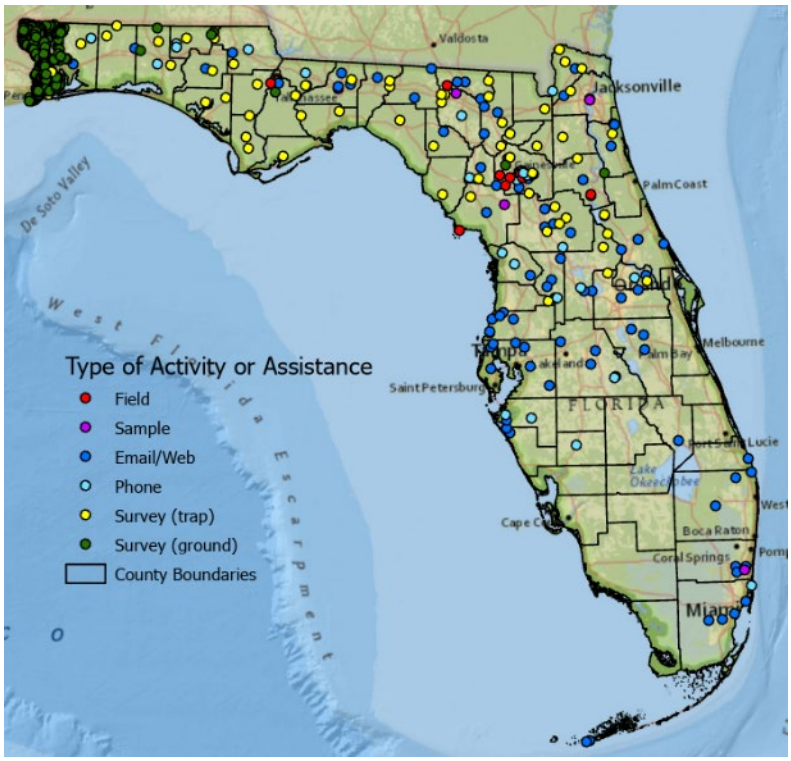

Figure 1. Locations (where recorded) of Forest Health-related assists performed by FFS Forest Health Section Staff, from October 1, 2019 to September 30, 2020. Note the large number of points in the Western Panhandle region, where extensive survey work was conducted to assess wind damage in the area impacted by Hurricane Sally.

Southern Pine Beetle Spring Pheromone Trapping Survey

The Southern Pine Beetle is one of the most destructive forest pests in the southern United States. Since 1995, the Florida Forest Service has participated in an annual statewide Southern Pine Beetle (*Dendroctonus frontalis*, or SPB) spring trapping survey. This survey monitors numbers of adult SPBs and their clerid predators captured in pheromone-baited flight traps during the SPB primary spring dispersal phase. The results are used as an early-season prediction of SPB population trends and activity levels, allowing forest managers to identify areas of potential SPB activity in advance of aerial detection flights. The survey also provides data for monitoring SPB population levels from year to year.

The annual survey to monitor SPB population levels was conducted from February to March 2020. The survey included 53 traps in 38 counties in North Florida. Relatively low numbers of SPB were detected in the survey locations (Figure 2). Collection data was submitted to Dartmouth College cooperators, for use in the new county-level SPB prediction model, which predicted low activity across most of the state (Figure 3).

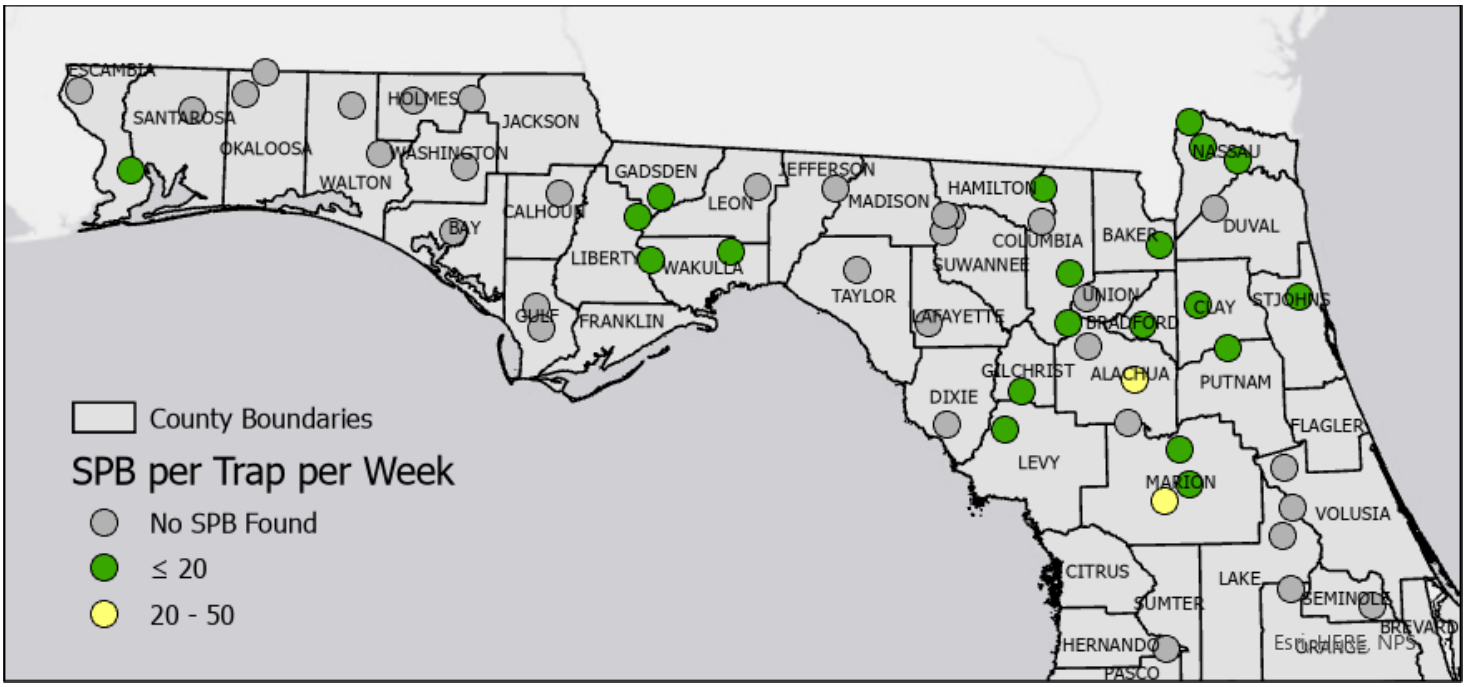

Figure 2. 2020 Southern Pine Beetle population levels (as SPB per trap per day) at each trap location.

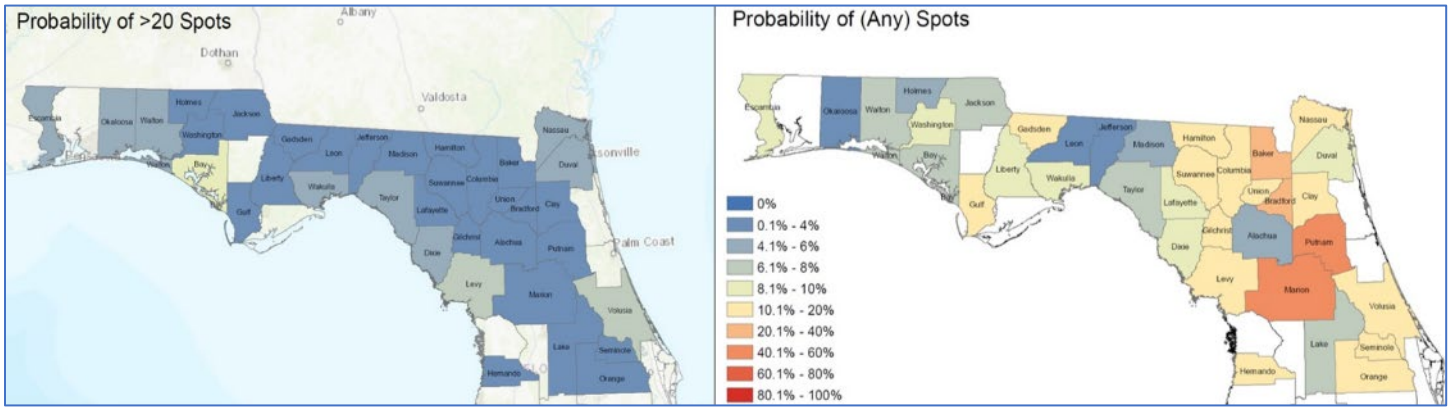

Figure 3. 2020 SPB county-level activity model prediction from Dartmouth College.

Southern Pine Beetle Surveillance and Activity

Despite the extra challenges posted by the COVID-19 pandemic, the annual aerial survey to detect southern pine beetle (SPB) infestations was conducted as usual in 2020. To reduce the risk of exposure between personnel, pilots received extra training to do survey flights without an additional observer in the aircraft, as needed. A total of 26 aerial surveillance flights have been flown logging over 9,900 miles during 57 hours of flight time. Total area surveyed for bark beetle surveillance flights is estimated at 22,000,000 acres (Figure 4). In keeping with the trapping survey prediction of low activity statewide, no SPB infestations were detected in the 2020 season.

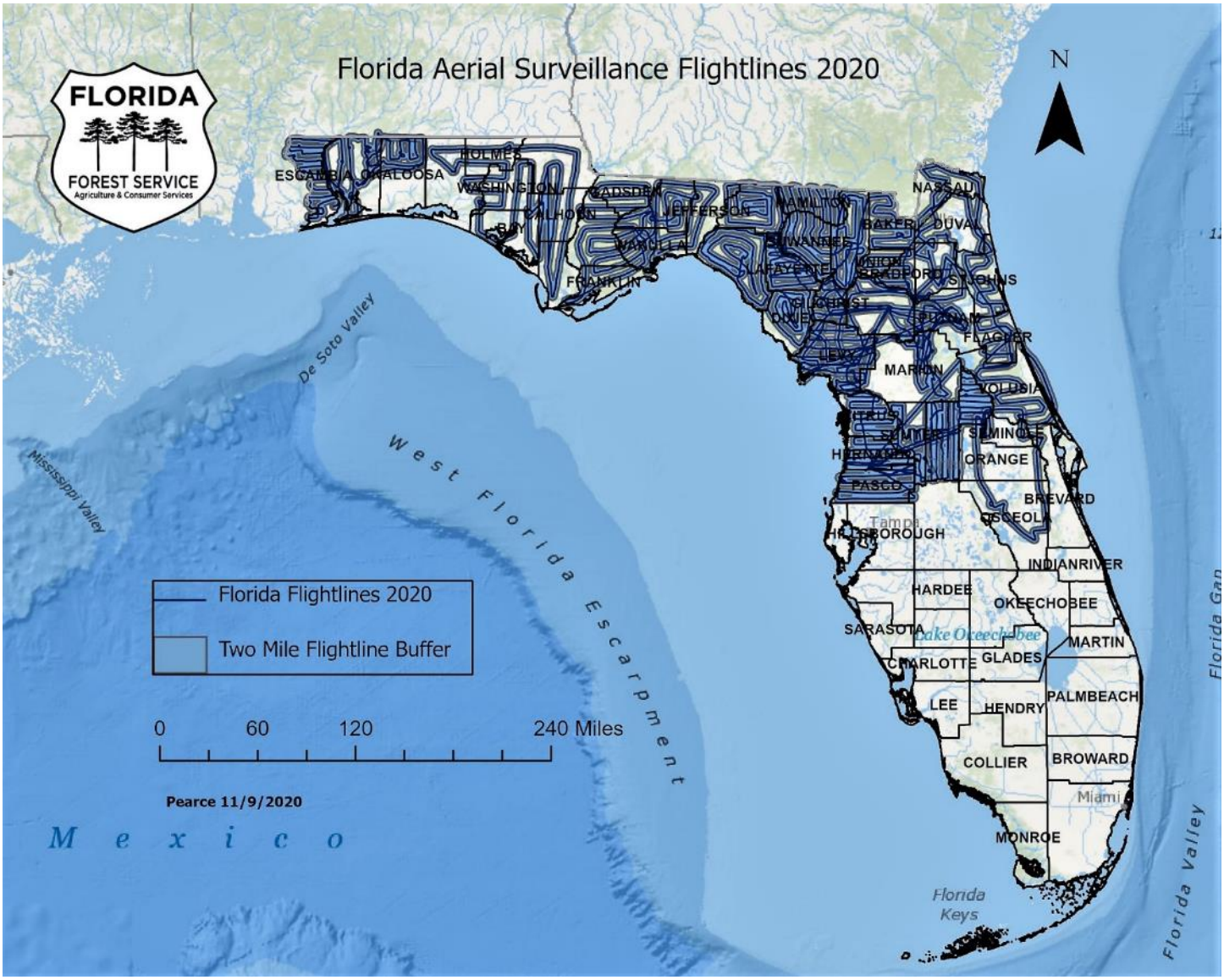

Figure 4. Flight paths and estimated survey area (2-mile buffer) covered by the SPB Aerial Survey program in Florida as of November 2020.

Hurricane Sally Damage Assessment Survey

Hurricane Sally struck as a Category 2 storm near the border of Alabama and Florida on September 16, 2020 and swept through Escambia and Santa Rosa Counties. On September 18, Forest Health staff conducted an aerial survey for initial damage assessment with transects flown over Escambia and Santa Rosa Counties. The fixed-wing aircraft pilot was accompanied by one observer with a Digital Mobile Sketch Mapping (DMSM) system to record observations. Scattered mostly moderate wind damage to timber was recorded in the southern third of these counties. Areas with standing water from hurricane-related flooding were also observed and recorded (Figure 5).

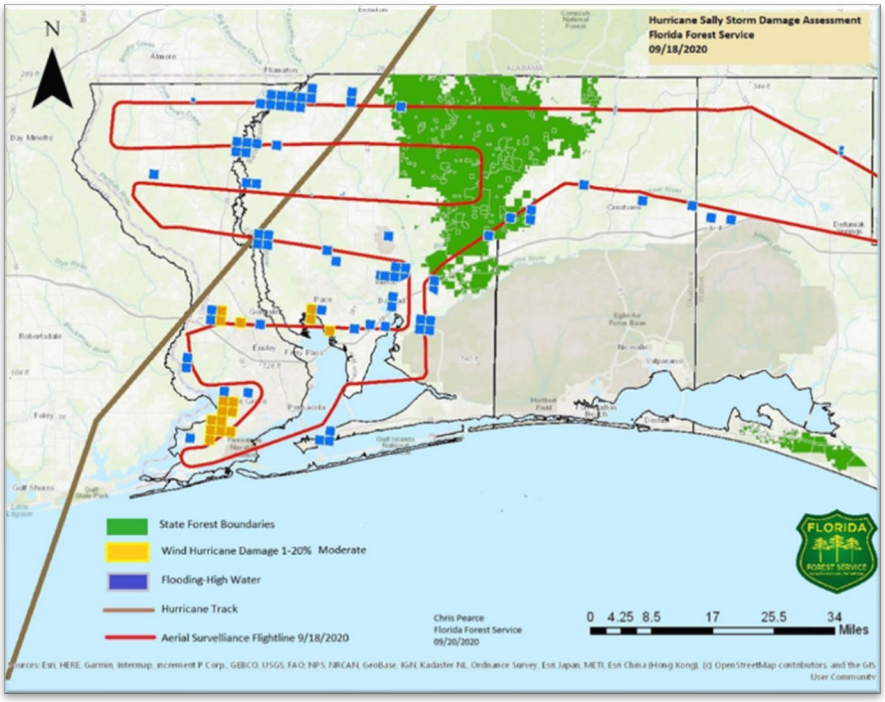

Figure 5. Flight path and areas of wind damage and flooding observed during the aerial survey flight conducted on September 18, 2020.

The initial aerial survey was followed by a systematic ground survey. One-mile square grids were placed over the map of wind damaged area, and ground survey observations of timber damage were recorded at points within these grid cells. Between September 20 and September 26, The Forest Health Survey Coordinator and Escambia County Forester collected data at 453 ground survey points. This approach detected far more timber damage than was readily observable from aircraft (Figure 6).

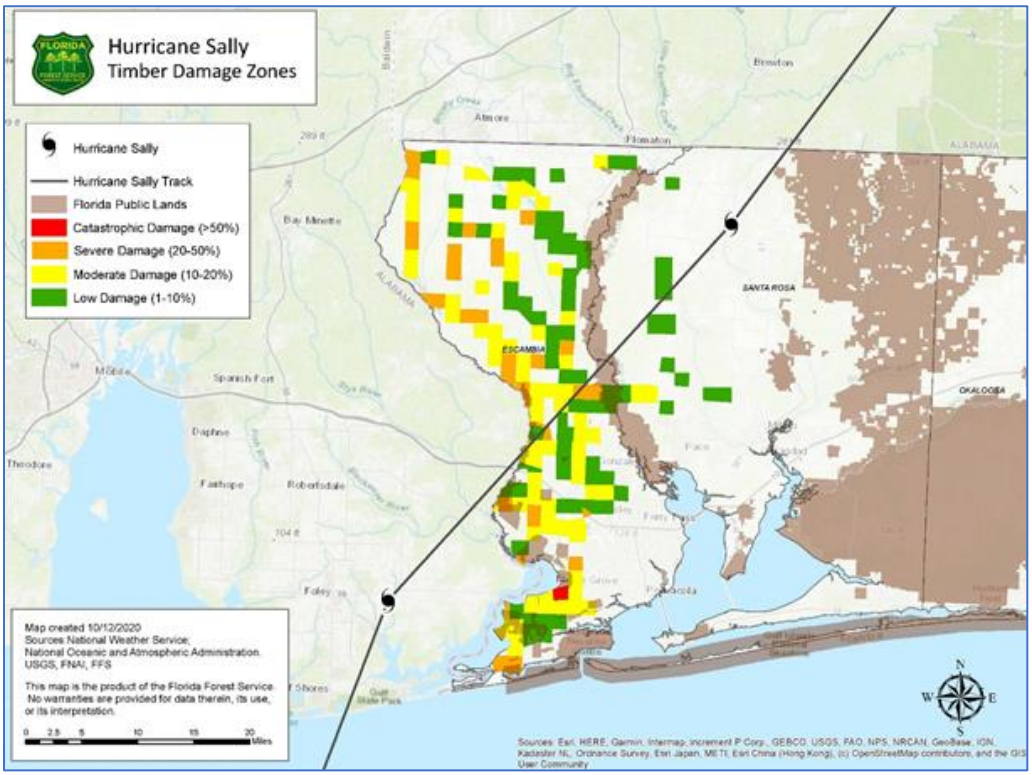

Figure 6. Results of the Florida ground survey to assess timber damage in the area impacted by Hurricane Sally.

Ips Engraver Beetles

In the summer of 2019, many reports began to be received regarding pine mortality in the region impacted by Hurricane Michael in October 2018, with associated infestations of *Ips* species. The FFS Forest Health Section began efforts to monitor the distribution and abundance of these bark beetles across the affected region, including a pheromone trapping survey in June-July 2019. This survey found that *Ips* populations were much higher in the region impacted by the hurricane, and that this association extended well outside of the region that sustained catastrophic damage. The trapping survey was repeated in June-July 2020 and found that the *Ips* population had decreased substantially compared to 2019, although was still generally higher in the areas that sustained more severe hurricane damage (Figure 7).

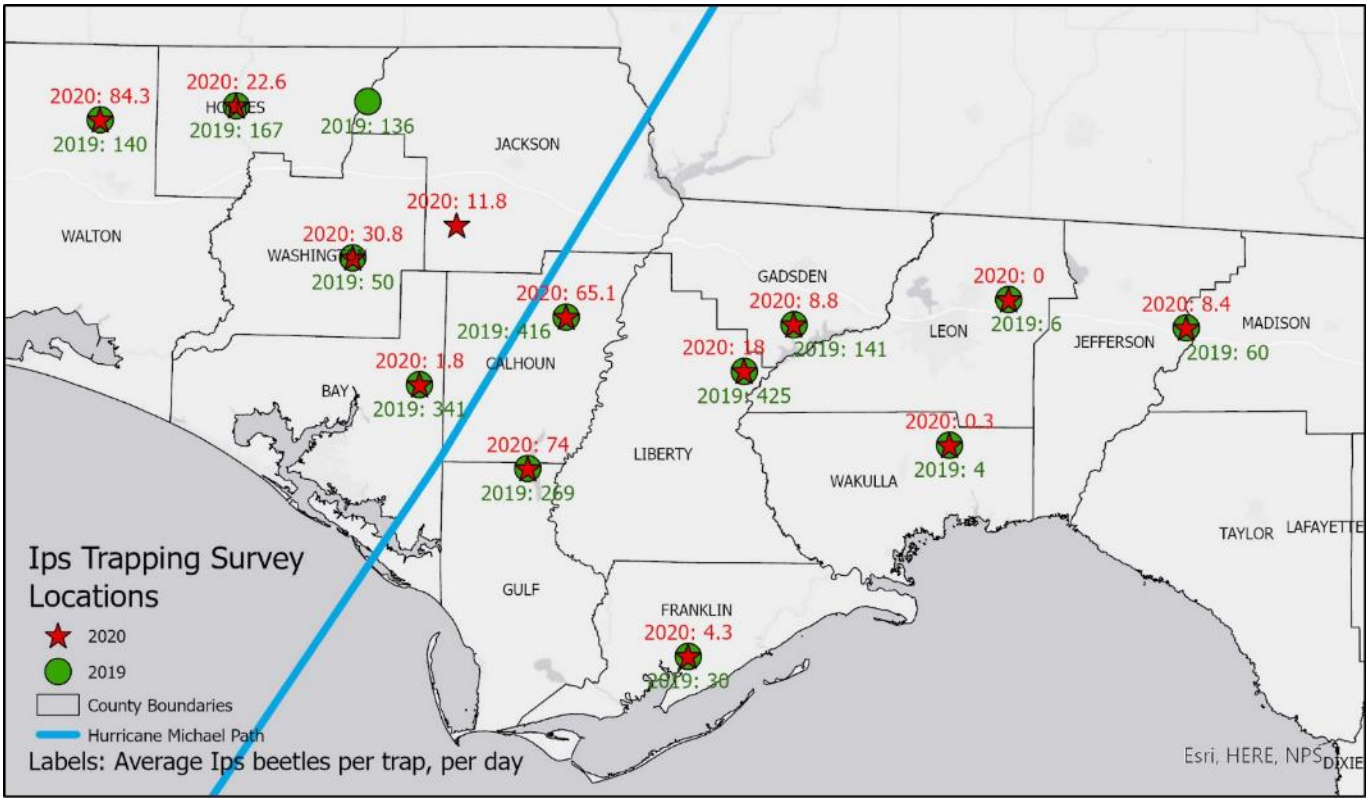

Figure 7. Locations of *Ips* pine engraver beetle pheromone survey traps (2019 and 2020) in the region impacted by Hurricane Michael in 2018.

The FFS Forest Health Section collaborated with a researcher from the University of Florida on a study regarding how well damage from small bark beetle infestations was detected by satellite imagery. This study used data from ground and aerial surveys conducted in 2019 to detect *Ips* engraver beetle infestations in the region impacted by Hurricane Michael. It found that although newer satellite products showed better ability to detect vegetation changes associated with small bark beetle infestations, they still missed some infestations detected by traditional survey methods. This study was published in October 2020 (see citation below).

Gomez, D.F., H.M.W. Ritger, C. Pearce, J. Eickwort, and J. Hulcr. 2020. Ability of remote sensing systems to detect bark beetle spots in the southeastern US. *Forests* 11(11): 1167-1176. https://www.mdpi.com/1999-4907/11/11/1167/htm

Sand Pine Sawfly Outbreak

Beginning in February 2020, reports of decline symptoms (browning and loss of needles) on sand pine (*Pinus clausa*) were received from the area of Lake Wales Ridge State Forest in Polk County. By the beginning of March, it was clear that these symptoms were caused by a large-scale outbreak of pine sawfly larvae (*Neodiprion* sp.), which were consuming the needles of both young and mature trees. In many cases, sand pines were stripped of nearly 100% of their needles (Figure 8). Nearby slash (*P. elliottii*) and longleaf pines (*P. palustris*) were unaffected. A ground survey by FFS field staff estimated that 1000 acres were defoliated on Lake Wakes Ridge SF, with some adjacent tracts on private property also affected.

Figure 8. Effects of pine sawfly feeding on sand pines on Lake Wales Ridge State Forest in March 2020. Left: Sand pines almost completely stripped of needles. Right: New growth emerging from branch tips on a defoliated sand pine.

The FFS Forest Health Section shared samples and images of the larvae with Dr. Catherine Linnen, an authority on pine sawflies at the University of Kentucky. Dr. Linnen determined them to be Knerer's pine sawfly (*Neodiprion knereri*), a species known only to feed on sand pine (Figure 9). Infestations of this species had occurred in Florida in the past, but they had been misidentified as *N. virginianus*. Through DNA analyses, Dr. Linnen and colleagues found that the population in Florida was a distinct species, which they named and described in 2012. This 2020 outbreak is the largest on record for this species.

Figure 9. Knerer's pine sawfly, *Neodiprion knereri*. Left: A colony of the larvae on a sand pine branch. Right: Magnified view of a preserved larva.

The sawfly population persisted in the area until the early summer, likely completing at least 3 generations before subsiding. No artificial control measures were implemented. Larvae collected and reared in chambers were found to be mostly killed by parasitoid insects, particularly tachinid flies, which commonly act as important natural controls for pine sawfly species. Despite the devastated appearance of many trees in the spring, nearly all of them survived and produced new needles before the end of the 2020 growing season.

For Further Information, Please Contact:

FFS Forest Health Section Staff:
Jeffrey Eickwort (Entomologist and Supervisor); (352) 395 4689; Jeffrey.Eickwort@FDACS.gov
Christopher Pearce (Survey Coordinator); (352) 395-4690; Christopher.Pearce@FDACS.gov
Allen Percifield (SPB Forester); (352) 395-4652; George.Percifield@FDACS.gov

Florida Department of Agriculture and Consumer Services
Florida Forest Service, Forest Health Section
1911 SW 34th St.
Gainesville, FL 32608
Florida Forest Service Forest Health Website

USDA Forest Service
Forest Health Protection, Southern Region (R8)
1720 Peachtree Road, NW
Atlanta, GA 30309
404-347-4095
USDA Forest Service, Region 8 Forest Health Website